REMARKS

To expedite the process, new claims are added and some claims are amended, in case the restriction is maintained although the application owner still preserve the right petition should the restriction is made final.

Claim 1 is amended to include all the limitations describing the main inventive concept – a three-dimensional non-linear ion trap mass spectrometry. Furthermore three other important concepts are: a) switching the ion trap between a three-dimensional mode and a two-dimensional mode, by cutting the ring electrode into and operating on the multiple pieces; b) superimpose a DC octopole field on a main quadrupole field, by cutting the cap electrodes into and operating on multiple pieces, c) operating the ion trap for ion mass analysis. These concepts work together to provide a complete analysis solution.

Claim 64 is added to include means for operating the ion trap for ions mass analysis. Claim 65 is added to include operating the ion trap between a three-dimensional mode and a two-dimensional mode. Claim 2 is amended to be dependent on claim 65 which discloses a specific way of operating the ion trap in three-dimensional mode, by cutting rotationally symmetric ring electrode into multiple pieces. Claim 66 is added to cover how to specifically operate on the multiple cut ring electrodes for switching modes.

Claim 3 is amended to be dependent on claim 1 which discloses an embodiment implementing the various means in the broad concept in claim 1. Claim 4 is amended to be dependent on claim 1 to cover a specific ring electrode shape. Claim 5 is original and claim 6 is cancelled. Claim 7 covers specific means in claim 1 having ring electrode shape as in claim 4.

Claim 66 is added to cover a two-dimensional version of corresponding claim 1, which originates from the same concept as claim 1. Claim 8 covers a specific two-dimensional ion trap structure in claim 66. Claims 9-11, 13, 14 are original which cover further details of the two-dimensional ion trap structure. Claim 12 covers specific embodiments of various means in claim 66. Claim 15 covers a application tool based on the two-dimensional ion trap in claim 8.

Claim 16 is cancelled. Claims 17-21 cover specific ways of cutting the ring electrode into multiple pieces in claim 2. Claim 22-24 cover how to operate the ion trap to switch between two modes when the ring electrode is cut into multiple pieces. Claims 25-56 further cover the functionalities of the ion trap when it operates under three-dimensional and two dimensional modes. Claim 27-28 are cancelled.

Claims 29-31, 33-35, 37-39, 41-42 cover methods of operating the ion trap for ion mass analysis, while claim 32, 36, 40 are cancelled. Claim 43-45, 47-55 cover applications where the disclosed ion trap is operating within a vacuum chamber, and further more a low pressure vacuum chamber, while claims 46, 56-58 are cancelled.

Claims 59-60 further expand the ion trap low pressure application to general ion trap other than what disclosed and claimed in current invention, which includes Paul trap.

Claim 61 covers one of the important concepts in this invention: superimpose a DC octopole field on a main quadrupole field, by cutting and operating on the cap electrodes into multiple pieces. Claim 62 covers another important concept in this invention: switching the ion trap between a three-dimensional mode and a two-dimensional mode, by cutting the ring electrode into and operating on the multiple pieces. Claim 63 covers a specific ring electrode shape in claim 62.

The claims are amended to follow the general claim 1, and the new claim listing should be searched and examined all together without serious burden.

Accordingly, search of the new claim set will necessarily involve looking for the same invention without serious burden.

No fee is believed to be due.

Respectfully submitted,

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